a plurality of route processing engines located within said router;

a mechanism that performs a hashing function on at least a portion of network layer information in the packets transferred to the routing system, to produce an indicia of a flow and,

means for switching packets with a same said indicia of a flow to a single route processing engine of said plurality of route processing engines.

11. (Four Times Amended) A router for distributing packets in a network, wherein the packets originate at a source and are routed to a destination, comprising:

a plurality of network interfaces that transfer the packets to a destination and from a source;

a plurality of route processing engines located within said router;

a fabric interconnecting said plurality of network interfaces and said plurality of route processing engines;

a hashing function to determine a distribution of the packets, by said fabric in response to an output of said hashing function, among said plurality of route processing engines.

17. (Twice Amended) A method, in a router, for selecting one processing engine of a plurality of processing engines located within the router for processing at least one packet, the method comprising the steps of:

hashing at least a portion of network layer information of at least one packet to determine a hash result, said hash result indicating a flow;

selecting one processing engine of said plurality of processing engines located within said router to process the flow indicated by said hash result.

Sub G4

26. (Twice Amended) A system, in a router, for selecting one processing engine of a plurality of processing engines located within said router for processing at least one packet, the system comprising:

F4

means for examining at least a portion of network layer flow information of the at least one packet; and

means, responsive to said at least a portion of network layer flow information, for selecting the one processing engine of said plurality of processing engines located within said router to preserve a packet flow indicated by the at least a portion of network layer flow information.

Sub G5

45. (Amended) A router, comprising:

F5

a plurality of processing engines located within said router for processing packets;

an interface for receiving a received packet from a network;

a data compiler to perform a hash function on said received packet to generate a hash result, and to select a selected processing engine from said plurality of processing engines located within said router in response to said hash result; and,

a switch to distribute said packet to said selected processing engine.

Sub I'

52. (Amended) A router, comprising:

F6

a plurality of processing engines for processing packets;

an interface for receiving a received packet from a network;

a data compiler to perform a hash function on said received packet to generate a hash result, and to select a selected processing engine from said plurality of processing engines in response to said hash result; and,

a switch to distribute said packet to said selected processing engine; and

said data compiler determines an IP source address having source bytes and an IP destination address having destination bytes and a protocol byte, and performs said hash function by performing an exclusive OR (XOR) to said source bytes and said destination bytes and said protocol byte to generate said hash result as at least one output byte, said at least one output byte to designate a flow to which said received packet belongs, and routing all packets having the same flow to a selected processing engine.

Cont F6

53. (Amended) A router, comprising:

a plurality of processing engines for processing packets;

an interface for receiving a received packet from a network;

a data compiler to perform a hash function on said received packet to generate a hash result, and to select a selected processing engine from said plurality of processing engines in response to said hash result;

a switch to distribute said packet to said selected processing engine; and

said data compiler puts packets received from said network into packet digest form before transferring them to said switch.

Sub I' F7

55. (Amended) The router as in claim 45, further comprising:

each processing engine of said plurality of processing engines has a plurality of queues, said packet has classification information in a header, and said processing engine selects a queue of said plurality of queues in response to said classification information.

Sub I'

61. (Amended) A router, comprising:

a plurality of processing engines for processing packets;

an interface for receiving a received packet from a network;

a data compiler to perform a hash function on said received packet to generate a hash result, and to select a selected processing engine from said plurality of processing engines in response to said hash result;

a switch to distribute said packet to said selected processing engine;

said data compiler detecting that a particular packet requires specialized processing; and

said switch distributing said particular packet to a specialized processing engine to perform said specialized processing.

Sub G

70. (Amended) A router, comprising:

a plurality of processing engines located within said router for processing packets;

an interface for receiving a received packet from a network;

means for performing a hash function calculation on said received packet to produce a hash result; and,

means, responsive to said hash result, for switching said received packet to a processing engine selected from said plurality of processing engines located within said router for further processing of said received packet.

Sub I'

78. (Amended) A method of processing packets in a router, comprising:

receiving a packet from a network;

performing a hash function calculation on said packet to produce a hash result;

switching, in response to said hash result, said packet to a processing engine of a plurality of processing engines in said router, for further processing of said packet; and

performing an exclusive OR (XOR) in response to a source address and a destination address and a protocol byte to generate said hash result as at least one output byte, said at least one output byte to designate a flow to which said received packet belongs, and routing all packets having the same flow to a selected processing engine.

80. (Amended) A method of processing packets in a router, comprising:

receiving a packet from a network;

performing a hash function calculation on said packet to produce a hash result;

switching, in response to said hash result, said packet to a processing engine of a plurality of processing engines in said router, for further processing of said packet;

detecting that a particular packet requires specialized processing; and

distributing said particular packet to a specialized processing engine to perform said specialized processing.

85. (Amended) A router, comprising:

a plurality of processing engines located within said router for processing packets;

an interface for receiving a received packet from a network;

a data compiler to determine a type of service required by a received packet; and,

a switch, responsive to said type of service, to distribute said packet to a selected processing engine of said plurality of processing engines located within said router, said selected processing engine providing said type of service.